FINAL ENVIRONMENTAL ASSESSMENT

REPAIR AND RECONSTRUCTION OF JOHN TOWNSEND DAM, FORT CARSON, CO

SEPTEMBER 2012

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Final Environmental Assessment for the Repair and Reconstruction of John Townsend Dam, Fort Carson, Colorado

1.0 Purpose of and Need for the Proposed Action

1.1 Introduction

John Townsend Dam (hereafter Townsend Dam or dam) is located approximately two miles southwest of Butts Army Airfield (BAAF) on the Fort Carson Military Reservation (Figure 1.1). The reservoir behind the dam receives water from the tributaries of the Rock Creek watershed and discharges into Rock Creek. Characterized by its substantial depth, Townsend Reservoir is the deepest water body on Fort Carson. Townsend Reservoir has been used for many years by the Army for recreational fishing, military training, and in support of firefighting efforts.

1.2 Purpose and Need

The Townsend Dam was observed to be in extremely poor physical condition during dam safety inspections by the Army Corp of Engineers as recently as 2010. The downstream embankment slope is steep with evidence of shallow sloughing (slope failure). The dam currently has no regulating outlet and as such, no way to draw down the reservoir below the level of the spillway crest. Considerable seepage has been observed not only at the downstream toe of the embankment but also near the top (upper 20') of the embankment. The downstream embankment contained a considerable amount of relatively large trees that have been removed by Fort Carson personnel. It is suspected the root systems of these trees have extended deep into the fill and as the roots decompose channels will develop thus allowing seepage to concentrate and hasten dam failure. The observed seepage and sloughing along with the substantial tree growth at Townsend Dam presents evidence of potential slope instability and piping (internal soil erosion). The purpose of the Proposed Action is to provide required remediation to insure continued long-term safe operation of the dam.

1.3 General Information

As seen in Figure 1.1, Fort Carson is located in central Colorado at the foot of the Rocky Mountains in El Paso, Fremont, and Pueblo counties. To the north is Colorado Springs, to the east is Interstate-25 and mixed development, to the south are privately-owned ranches, and to the west is State Highway 115. Downtown Colorado Springs and Denver lie approximately 8 miles and 75 miles, respectively, to the north, while the City of Pueblo is located approximately 35 miles south of the main post area.

Fort Carson covers approximately 137,000 acres, and extends between 2 and 15 miles east to west and approximately 24 miles north to south. The main post area, which consists of developed land and a high density of urban uses, is located in the northern portion of the installation and covers approximately 6,000 acres. The downrange area, which is used for large caliber and small-arms live-fire; individual and collective training; aircraft, wheeled and tracked vehicle maneuver operations; and mission readiness exercises, covers approximately 131,000 acres of unimproved or open lands. Additionally, Butts Army Airfield is located in the northeast quadrant of the downrange area and is used for command and control of flight operations as well as maintenance and repair of aircraft.

The region including Fort Carson is classified as mid-latitude semi-arid and is characterized by hot summers, cold winters, and relatively light rainfall. July is the warmest month with the

average daily maximum temperature of 84.4° Fahrenheit, and January is the coldest month with an average daily minimum temperature of 14.5° Fahrenheit. Mean annual precipitation at Fort Carson increases as one moves toward the northwest. Colorado Springs averages 17.5 inches of precipitation annually, with about 80 percent falling between April and September. Average annual snowfall in the region is 42.4 inches. Snow and sleet usually occur from September to May with the heaviest snowfall in March and possible trace accumulations as late as June.

1.4 Scope of Environmental Assessment

This site specific environmental assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations implementing NEPA in 40 CFR 1500, and 32 CFR Part 651 (Army Regulation [AR] 200-2), *Environmental Analysis of Army Actions.* The EA assesses the known and potential environmental and socioeconomic impacts, both positive and negative, and mitigation measures associated with the Proposed Action and alternatives. This EA also addresses the potential for future connected actions and cumulative impacts. As determined from scoping, this EA analyzes in detail only those resource areas that would be expected to be affected as a result of the implementation of the Proposed Action.

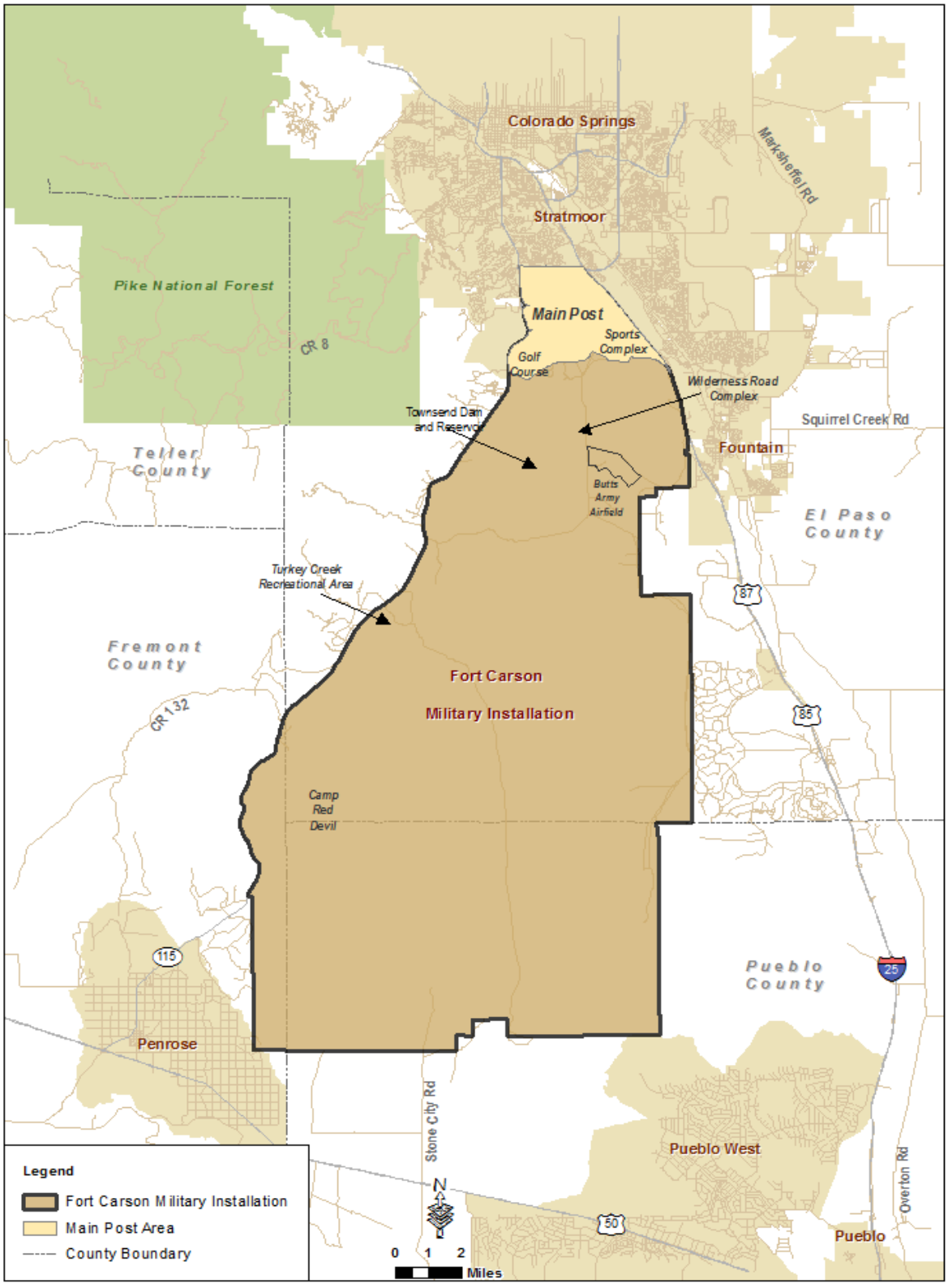

Figure 1.1: Fort Carson Military Reservation

2.0 Description of the Proposed Action

2.1 Proposed Action

The Proposed Action to repair and reconstruct Townsend Dam includes: repairing the earth fill embankment, the removal of downed trees (to include the stumps along with the root balls), the placement of an impervious drainage or seepage blanket on the downstream slope, placement of a stability berm overlying the seepage blanket, locating and repairing the upstream inflow pipe, raising the embankment crest, and grading the spillway channel to convey the design flow.

A seepage blanket shall be installed to control seepage exiting the downstream embankment slope and to enable safe discharge of the seepage water at the toe to maximize the amount of seepage collected and prevent soil erosion. The upper 6 inches of the downstream slope shall be stockpiled and reused as topsoil on the stability berm. The seepage berm shall extend a minimum of 5 feet above any evidence of seepage on the downstream face of the embankment. Complete draw down of the reservoir will be considered as a measure to support the Proposed Action. It is anticipated that pumping of the reservoir will be required in order to drain the water from behind the dam as currently no drain structure exists to facilitate the activity.

3.0 Alternatives Considered

3.1 No Action

There would be no repair and reconstruction of the Townsend Dam under the No Action Alternative. The No Action Alternative is considered to be no changes to the existing conditions at Fort Carson. This will provide a baseline against which the effects of the Proposed Action may be compared.

3.2 Proposed Action

The Proposed Action is detailed above in section 2.1.

3.3 Reasonably Foreseeable Cumulative Actions

Cumulative impacts are the direct and indirect effects of a proposed project's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action. Guidance for implementing NEPA recommends that federal agencies identify the temporal and geographic boundaries of the potential cumulative effects of a Proposed Action (Council on Environmental Quality, 1997).

The temporal boundaries associated with this project are projects that have taken place within the last three years prior to the development of this environmental assessment and future foreseeable projects that are likely to be undertaken within the next three years.

The geographic boundaries of analysis vary, depending on the resource and potential effects. For most resources, the Region of Influence (ROI) for cumulative impacts is the same as the ROI used to analyze the effects from the Proposed Action and No Action Alternative. For this environmental assessment the ROI is the Rock Creek watershed in which the Proposed Action is located, which reflects the scope of the Proposed Action, its influence upon, and influence by other projects located within the watershed.

The construction of a brigade complex along Wilderness Road north and west of Butts Army Airfield (Figure 3.3),has seen the development of company operation facilities, motorpools, headquarter facilities, barracks, and dining facilities and will be considered as part of the cumulative impacts analysis. Construction on Butts Army Airfield in support of the stationing of a Combat Aviation Brigade (CAB) at Fort Carson (Fort Carson, 2012a) will potentially produce cumulative impacts in relation to the Proposed Action. Figure 3.3, the current Fort Carson Master Plan for Wilderness Road and Butts Army Airfield depicts anticipated future projects associated with the CAB. The construction of facilities along Wilderness Road and future construction at the airfield fall within the temporal and geographic boundaries of the cumulative actions for the purpose of this environmental analysis.

Figure 3.3: Master Site Plan for Fort Carson Wilderness Road Complex and Butts Army Airfield.

4.0 Affected Environment

This section discloses potential environmental effects related to each alternative and provides a basis for evaluating these effects in context relative to the effects of other actions. Effects can be direct, indirect, or cumulative. Direct effects occur at the same place and time as the actions that cause them, while indirect effects may be geographically removed or delayed in time. Council on Environmental Quality guidance states that a cumulative impact is an effect on the environment that results from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place locally or regionally over a period of time.

This environmental assessment focuses on resources and issues of concern in the following resource areas:

- Geology and Soils
- Biological Resources
- Water Resources
- Cultural Resources

Areas with no discernible concerns or known effects, as identified in the issue elimination process (see Section 4.1, *Issues Not Addressed*), are not included in this analysis. For ease in comparing environmental effects with existing conditions and mitigation specific to each environmental area of concern, each section below will describe existing conditions, describe the effects of each alternative, identify any cumulative effects on that area of concern, and describe site-specific mitigation. A summary of environmental consequences is provided in Chapter 5.

4.1 Issues Not Addressed

Initial issue analyses resulted in the elimination of some potential issues because they were not of concern or were not relevant to the Proposed Action and alternatives. Brief discussions of the rationale for these decisions are below.

4.1.1 Air Quality

Neither the Proposed Action or the No Action Alternative would have any measurable effects on air quality resources. There is the potential for short-term and temporary fugitive dust generated at these sites during repair and reconstruction from heavy equipment, but existing fugitive dust control measurements would be utilized. Additionally, the site is outside of the El Paso County carbon monoxide maintenance area.

4.1.2 Air Space Use

Neither the Proposed Action or the No Action Alternatives would change existing airspace use on Fort Carson.

4.1.3 Environmental Health and Safety Risks for Children

Executive Order No. 13045, *Protection of Children from Environmental Health Risks and Safety Risks* was issued in April 1997. This Executive Order (EO) directs each federal agency to "*ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health or safety risks*". Sensitive areas for exposure to children are schools and family housing areas. Environmental health and safety risks are

attributable to products that a child might come in contact with or ingest as well as safety around construction areas and areas of buildings that pose safety hazards.
Neither the Proposed Action nor its alternatives would change environmental health or safety risks to children since the area is well within the boundaries of Fort Carson (the nearest boundary to the sites is over 5 miles, and the nearest Fort Carson Family Housing is approximately 13 miles from the site). Neither the Proposed Action or the No Action Alternative would have significant or disproportionate adverse effects on children or pose health or safety risks.

4.1.4 Environmental Justice

Executive Order No. 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, issued in February 1994, provides that "*each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations*". Neither the Proposed Action or the No Action Alternative would change any existing impacts with regard to minority and/or low-income populations.

4.1.5 Hazardous Waste/Materials

Neither the Proposed Action or the No Action Alternative would generate hazardous wastes or use additional hazardous materials. The likelihood to encounter contamination on the proposed project site is remote. Any discovery of hazardous material contamination would require appropriate regulatory coordination and compliance. If contamination is encountered, appropriate measures would be taken to remediate the site. Any spills would be cleaned up in accordance with the Fort Carson Spill Prevention, Control, and Countermeasure Core Plan (2009a) and Fort Carson Regulation 200-1. This plan includes provisions from other Fort Carson plans such as the Prevention Plan Management Plan (2008a).

4.1.6 Land Use

Neither the Proposed Action or the No Action Alternative would change existing land use. Land affected by the Proposed Action on Fort Carson would continue to be used as water impoundments, for fishing , military training, and in support of fire fighting efforts.

4.1.7 Noise Environment

Neither the Proposed Action or the No Action Alternative would change the noise environment conditions from what currently exists. Noise generated at these sites from heavy equipment during repair and reconstruction activities would be short-term and temporary.

4.1.8 Socioeconomics

There may be a slight beneficial economic impact resulting from the repair and reconstruction of the Proposed Action; however this would be short-term and temporary. The No Action Alternative would have no impact on socioeconomics.

4.1.9 Sustainability

Neither the Proposed Action or the No Action Alternative would impact sustainability efforts on Fort Carson.

4.1.10 Transportation
Neither the Proposed Action or the No Action Alternative would impact traffic patterns on Fort Carson or surrounding communities.

4.1.11 Utilities
No utilities fall within the boundaries of the Proposed Action, therefore neither the Proposed Action or the No Action Alternative will impact utilities.

4.2 Geology and Soils

4.2.1 Existing Conditions
Fort Carson lies in the Colorado Piedmont section of the Great Plains Province and the Rampart Range section of the Southern Rocky Mountains. Primary landforms consist of low and high plains, foothills, rock outcroppings, and low mountains. Elevation ranges from approximately 5,400 feet to 6,400 feet above MSL (Dames and Moore,1978).

There are two main fault lines in the region: Ute Pass and the Rampart Range faults. The region is rated "zone one" for earthquake potential on a scale of zero to four, with a 'four' having the greatest potential for earthquakes. Very small earthquakes do occur in the region, with mostly unnoticeable effects.

Geologic units on Fort Carson range in age from Quaternary (one million years before present to recent) to Pennsylvanian (200 to 250 million years before present). Unconsolidated sediments deposited during the Quaternary consist of alluvial sands, silts, and gravels and wind-deposited silts and sands. Consolidated units include shale, limestone, hard sandstone, siltstone, claystone, and conglomerate sandstone and shale (Dames and Moore,1978).

4.2.2 Environmental Consequences
The soils overlying bedrock at Townsend Dam are generally at least five feet deep (U.S. Department of Agriculture Soil Conservation Service,1976). Based on the design drawings for Townsend Reservoir, most work will consist of adding suitable material to existing ground levels. Exceptions to this will be clearing and grubbing, keying-in of fill lifts, and widening of the existing Townsend spillway. All those activities appear to involve cuts of approximately four feet or less.

4.2.2.1 Proposed Action
It is not anticipated that construction will have any long-term adverse effects on the geology and soils of the areas in question.

4.2.2.2 No Action Alternative
Under the No Action Alternative no repairs will be undertaken for the Townsend Dam. Seepage will continue and the potential for sloughing and erosion will continue to exist.

4.2.2.3 Cumulative Effects
There are no anticipated cumulative impacts to geology and soils related to the Proposed Action.

4.2.2.4 Site-specific Mitigation
There are no anticipated impacts to geology and soils related to the Proposed Action, therefore there are no site-specific mitigation measures required.

4.3 Biological Resources

4.3.1 Existing Conditions

Biological resources on Fort Carson exist primarily on the training ranges. The proposed site is composed primarily of riparian grasslands.

4.3.2 Vegetation

The *Fort Carson Integrated Natural Resource Management Plan* (INRMP) (Fort Carson, 2007) contains detailed descriptions of the vegetative communities on Fort Carson and a listing of common and scientific names of plant species known to occur.

4.3.2.1 Noxious Weeds (General)

There are 28 noxious weeds known to occur on Fort Carson. Only one, Myrtle spurge (*Euphorbia myrsinites*) is considered a List A species in Colorado. There are 19 known List B weed species on Fort Carson. They are Absinth wormwood (*Artemisia absinthium*), Bouncingbet (*Saponaria officinalis*), Bull thistle (*Cirsium vulgare*),Canada thistle (*Cirsium arvense*), common teasel (*Dipsacus fullonum*), Cutleaf teasel (*Dipsacus laciniatus*), Dalmation toadflax (*Linaria dalmatica*), diffuse knapweed (*Centaurea diffusa*), hoary cress (*Cardaria draba*), houndstongue (*Cynoglossum officinale*), leafy spurge (*Euphorbia esula*), Musk thistle (*Carduus nutans*), Redstem filaree (*Erodium cicutarium*), Russian-olive (*Elaeagnus angustifolia*), salt cedar (*Tamarix chinensis, T. parviflora,* and *T. ramosissima*), Scotch thistle (*Onopordum acanthium*), spotted knapweed (*Centaurea maculosa*), perennial pepperweed (*Lepidium latifolium),* and yellow toadflax (*Linaria vulgaris*). List C weed species known to occur at Fort Carson include: Chicory (*Cichorium intybus*), common burdock (*Arctium minus*), common mullein (*Verbascum thapsus*), common St. Johnswort (*Hypericum perforatum*), downy brome (*Bromus tectorum*), field bindweed (*Convolvulus arvensis*), jointed goatgrass (*Aegilops cylindrica*), poison hemlock (*Conium maculatum*), and puncturevine (*Tribulus terrestris*). As part of the federal mandate to control noxious weeds as directed in *Section 15 of the Federal Noxious Weed Act of 1974, "Management of Undesirable Plants on Federal Lands,"* Fort Carson has developed the *Fort Carson and PCMS Invasive Plants Management Plan* (Fort Carson, 2008b). The plan addresses noxious weed management strategies for Fort Carson through 2012 and is reviewed and updated annually if necessary.

In 1997, Fort Carson initiated a biological control program as part of a federal initiative to reduce herbicide use by up to 80 percent. The program, using natural enemies (insects and mites) to reduce weed densities, provides a sustainable and environmentally-sound solution to noxious weed issues, while preserving the vulnerable plant and animal communities on Fort Carson. The biological control program has been successful at significantly reducing weed populations at several sites and has grown into a partnering initiative with several other federal agencies along the Colorado Front Range. However, effective biological control agents are not available to treat all invasive species on Fort Carson. Therefore, at times, other control methods are used such as physical measures, chemical measures, and preventive measures.

4.3.3 Wildlife

4.3.3.1 Federally Listed Species

The Endangered Species Act defines an endangered species as any species in danger of extinction throughout all or a major portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future. Candidate species are those for which the U.S. Fish and Wildlife Service (USFWS) has sufficient information on their biological status and threats to propose them as endangered or threatened, but listing is precluded by other higher

priority species. Table 4.3 presents federally-listed endangered, threatened, and candidate species found on Fort Carson. No critical habitat for these species has been designated on Fort Carson.

Table 4.3: Federally-Listed Endangered, Threatened, and Candidate Species Known to Occur at Fort Carson

Species	Scientific Name	Species Type	Status	Distribution on Fort Carson
Mexican spotted owl	*Strix occidentalis*	Bird	T	Rare winter resident
Arkansas Darter[1]	*Etheostoma cragini*	Fish	C	Introduced to multiple sites on Fort Carson

Source: Fort Carson, 2007
[1]Species is also identified as state-listed.
C- Candidate
T- Threatened

Mexican Spotted Owl –Threatened Species
The Mexican Spotted Owl nests in rugged forested canyons west of Fort Carson. It is a rare winter resident on Fort Carson and known to have occurred only on and adjacent to Booth Mountain. It is not known if the species is present annually. A radio tagged owl present on Fort Carson in the winter of 1995-1996 did not return in subsequent years. The species is not suspected of breeding on Fort Carson. The *Biological Assessment and Management Plan for the Mexican Spotted Owl on Fort Carson* contains more information on this species (Directorate of Environmental Compliance and Management, 2002a).

Arkansas Darter- Candidate Species
The Arkansas darter is a federal candidate for listing as a threatened species. The darter is found at a few sites on the installation. It is not known to occur within the project area.

4.3.3.2 State Listed Species, Species of Concern, and Army Species at Risk
Special status wildlife species are known to occur on Fort Carson (Fort Carson, 2007). These species are tracked by the Colorado Division of Parks and Wildlife (CPW), Colorado Natural Heritage Program (CNHP), USFWS, and the US Army. State threatened and endangered wildlife species are protected by Colorado state law. Avian Species of Concern are protected by Colorado state law, the Migratory Bird Treaty Act, and the Eagle Protection Act. Sensitive species of plants are not protected by state or federal laws.

Species of special concern that are either known or potentially occur on Fort Carson include Ferruginous Hawk (*Buteo regalis*), American Peregrine Falcon (*Falco peregrinus anatum*), Mountain Plover (*Charadrius montanus*), Northern Leopard Frog (*Rana pipiens*), Black Tailed Prairie Dog (*Cynomys ludovicianus*), and Triploid Checkered Whiptail (*Cnemidophorus neotesselatus*). Those species that are Federally-listed were discussed previously and omitted from this list. Those species that could occur in the proposed project site are discussed in the following paragraphs. Detailed accounts of these species on Fort Carson can be found in the *Integrated Natural Resources Management Plan for Fort Carson and the Piñon Canyon Maneuver Site* (Fort Carson, 2007).

Black-tailed Prairie Dog

The black-tailed prairie dog, a former candidate for federal listing, is common on Fort Carson occupying approximately 7,700 acres in 78 colonies. It is listed as a Species of Special Concern in Colorado by CPW and the CNHP. Frequently referred to as a keystone species of the shortgrass prairie ecosystem, the prairie dog plays a significant role in life cycles of several Species of Special Concern on Fort Carson: the ferruginous hawk, bald and golden eagles, mountain plover, and the state-listed burrowing owl. Prairie dogs are managed on Fort Carson according to prescriptions detailed in the installation's management plan for the black-tailed prairie dog. The plan balances conservation with human health and property loss and details circumstances for lethal control of the species on Fort Carson.

Mountain Plover

Mountain plovers are rare on Fort Carson with only a small percentage of available habitat occupied. Mountain plovers are known to selectively inhabit black-tailed prairie dog colonies on Fort Carson during the breeding season (Directorate of Environmental Compliance and Management, 2002b). Surveys for this species are conducted annually and it is not known to occur in or near the proposed area.

Burrowing Owl

The burrowing owl is a small burrow-dwelling owl nesting underground in unoccupied prairie dog burrows. The burrowing owl is not abundant on Fort Carson and the number of prairie dog colonies annually occupied by this species is low (Fort Carson, 2007). Although sylvatic plague does not directly influence nesting burrowing owls, they generally do not nest in colonies where all prairie dogs have been killed by plague. This species is not known to nest within the proposed area.

Golden Eagle

There are no known Golden Eagle eyries within the area of the Proposed Action.

Northern Leopard Frog

The northern leopard frog is rated by the CNHP as a Species of Special Concern. There were 34 adults recorded in the Rock Creek watershed near Townsend Reservoir. The northern leopard frog is petitioned for listing under the Endangered Species Act.

4.3.4 Wetlands

Wetlands and activities within them are regulated by Section 404 of the Clean Water Act administered by the US Army Corp of Engineers. The pumping and discharge of clear, uncontaminated water is not regulated by USACE nor are the proposed dam reconstruction and repair activities. On Fort Carson wetlands are generally characterized as linear (e.g., streams) or small and isolated.

4.3.5 Environmental Consequences

4.3.5.1 Proposed Action

4.3.5.1.1 Vegetation

The Proposed Action would have temporary negative impacts on vegetation during reconstruction and repair activities. There exists the potential that noxious weeds could become established in disturbed areas following construction activities associated with the Proposed Action.

4.3.5.1.2 Wildlife

The Proposed Action would result in temporary short-term negative impacts, including mortality, disturbance, or displacement, and loss of habitat of nesting or foraging territory during reconstruction and/or repair. The bottom of Townsend Dam possesses a population of northern leopard frogs that may be temporarily impacted. Waterfowl, tree and shrub nesting birds, and shore/ground nesting birds may potentially nest in the project area. The primary nesting season for most birds protected by the Migratory Bird Treaty Act occurs between 15 April - 15 September annually; although some owls may begin nesting in large trees as early as January of each year.

4.3.5.1.3 Wetlands

U.S. Jurisdictional waters occur within the area for the proposed project and may be impacted by the Proposed Action. If the project disturbs any jurisdictional waters, it must meet the regulatory requirements of the Clean Water Act Section 404. Any disturbance to US jurisdictional waters (e.g., soil or vegetation disturbance or removal) may require a Section 404 permit. Jurisdictional waterways encompass the drainage area up to the ordinary high water mark and water does not have to be present to be a US jurisdictional waterway.

It is anticipated that short-term negative consequences may be associated with the Proposed Action as lakeshore wetlands become desiccated following drainage of the reservoir pool. The Proposed Action may also result in short-term benefits to wetlands downstream of Townsend Dam as a result of recharge from draining of the reservoir pool. Specifically, wetlands near Haymes Reservoir may benefit from the draining of the Townsend Dam reservoir.

4.3.5.2 No Action

4.3.5.2.1 Vegetation

Under the No Action Alternative, there would be no change to vegetation as it currently exists.

4.3.5.2.2 Wildlife

Under the No Action Alternative, there would be no change in impacts to wildlife as they currently exist.

4.3.5.2.3 Wetlands

Under the No Action Alternative, there would be no change to wetlands that currently exist.

4.3.5.3 Cumulative Effects

4.3.5.3.1 Vegetation

There are no foreseeable cumulative long-term impacts associated with the Proposed Action.

4.3.5.3.2 Wildlife

The Proposed Action results in a variety of potential cumulative impacts including mortality, disturbance or displacement, and loss of habitat within nesting or foraging territory. The Proposed Action includes a number of management measures, such as those described in the INRMP and mitigations to avoid and minimize these impacts.

4.3.5.3.3 Wetlands

There are no foreseeable cumulative long-term impacts associated with the Proposed Action.

4.3.5.4 Site-specific Mitigation

4.3.5.4.1 Vegetation

The execution of the Proposed Action would include best management practices (BMPs). Reseeding with Fort Carson approved native grass mix (Appendix B) will reduce the likelihood of noxious weed invasion in disturbed areas. Stockpiling of topsoil and its reapplication over the finished site prior to reseeding will provide a suitable growth medium. Coordination with the installation Forestry Program is required if any tree disturbance is anticipated. Additionally, the Standard Forestry Operating Procedures (Appendix C) must be adhered to throughout all phases of the Proposed Action.

4.3.5.4.2 Wildlife

Prior to ground disturbance due to construction, wildlife surveys will be conducted to ensure no active nests are within the construction footprint. If a prairie dog colony will be disturbed as part of the Proposed Action, DPW Wildlife Office will conduct 3 days of burrowing owl clearing surveys in accordance with State protocols. If the ground disturbing activity takes place during the Migratory Bird Treaty Act nesting season of 15 April - 15 September then DPW Wildlife Office will conduct clearing surveys for ground/shrub nesting birds in order to minimize potential MBTA violations. Surveys for waterfowl and shore nesting birds, and/or active nests will be conducted by DPW-Wildlife prior to disturbance of the shoreline and riparian zone. If active MBTA nests are found, the DPW-Wildlife Office will contact Fort Carson Conservation Law Enforcement Officers to coordinate a take permit with USFWS. If the USFWS does not grant a take permit, tree and relevant shoreline/riparian area removal may not occur until birds have fledged the nest(s). A clearing survey for Northern Leopard frogs prior to reconstruction activities commencing will be conducted by the DPW Wildlife Office. If the frogs are encountered, the Fort Carson Wildlife staff will relocate them to a protected location on the installation. Work will be performed according to and in compliance with all laws and regulations to include, but not limited to; the Migratory Bird Treaty Act the Endangered Species Act, and the Clean Water Act.

Prior to the reservoir behind Townsend Dam being emptied, capture and relocation of recreational fish and sensitive amphibian species will take place. DWP-Wildlife personnel will coordinate the capture and relocation efforts.

4.3.5.4.3 Wetlands

If a drainage has the potential to be impacted and is considered a jurisdiction water under section 404 of the Clean Water Act, the Fort Carson Watershed Program office must be contacted. Any work potentially impacting US jurisdictional waters will be coordinated and submission of Section 404 permit requests made through the Fort Carson Watershed Program.

4.4 Water Resources

4.4.1 Existing Conditions

Fort Carson policy is to eliminate or minimize the degradation of all water resources on Fort Carson and ensure compliance with all applicable federal, state and local water quality standards (Fort Carson Regulation 200-1). Water resources are managed in coordination with U.S. Geological Survey, Natural Resources Conservation Service, U.S. Fish and Wildlife Service, and many other external agencies. The *Water Resources Management Program* on Fort Carson includes watershed/sedimentation monitoring and management and project reviews to address erosion and sediment control issues. In addition, the *Stormwater Management Plan* (Fort Carson, 2011) is designed to reduce the discharge of pollutants from Fort Carson to drainage ways, to protect water quality, and to satisfy Colorado's water quality standards.

4.4.1.1 Surface Water

4.4.1.1.1 Stormwater

The Fort Carson Stormwater Program's main objective is to protect surface waters from pollution. Stormwater runoff can carry physical, chemical, and biological pollutants to sewer systems or directly to a pond, creek, river, or wetland. Therefore, construction and post-construction stormwater controls are assessed on a watershed scale during project planning phases. These controls are implemented via the National Pollution Discharge Elimination System (NPDES) General Construction General Permit for Large and Small Construction Activities, and Fort Carson's Municipal Separate Storm Sewer Systems (MS4s).

Stormwater runoff from the area encompassed in the Proposed Action will drain to the Rock Creek watershed as will runoff from the construction projects proposed and previously built within the Wilderness Road Complex and Butts Army Airfield. As discussed in section 3.3 the Rock Creek watershed serves as the geographic boundary for analysis of cumulative impacts.

FORT CARSON STORMWATER PERMITS:

Construction General

Construction projects are authorized to discharge stormwater runoff from construction sites under a NPDES Construction General Permit. If a project required one acre or more of ground disturbance contractors must file with the USEPA. In addition, contractors must develop and implement a Fort Carson approved Stormwater Pollution Prevention Plan (SWPPP) .

Municipal Separate Storm Sewer System (MS4)

Under the National Pollution Discharge Elimination System stormwater program, operators of regulated MS4s, which includes all of Fort Carson, are authorized to discharge stormwater under conditions detailed in the NPDES permit. Fort Carson's MS4 permit number is COR042001 and the permit expires April 29, 2014. Fort Carson manages NPDES MS4 stormwater permit requirements in accordance with its MS4 permit (USEPA, 2009) and *Stormwater Management Plan (SWMP), Fort Carson, Colorado*.

Currently, the precipitation that falls onto Butts Army Airfield, which is located on a bluff, travels into ravines via overland flow from the undeveloped portions of the bluff or through a conventional stormwater system from the developed areas. The ravines convey the stormwater down about 100 feet in elevation, and eventually discharge the stormwater into the Northside Reservoir, which then drains to the Rock Creek. Rock Creek exits Fort Carson where it merges with Little Fountain Creek, then discharges into Fountain Creek that is a tributary of the Arkansas River.

4.4.1.2 Hydrogeology and Groundwater

Groundwater at Fort Carson exists in both alluvial and bedrock aquifers. The alluvial aquifers are formed from unconsolidated deposits of stream alluvium, colluvium, and residuum that are moderately permeable, lying above the Pierre Shale which is more impermeable. The alluvial aquifers can provide well yields from 10 to more than 100 gallons per minute (gpm) (Leonard,1984). In much of the Arkansas River Basin, hydraulic heads are lower in the deep bedrock aquifers than those in the shallow formations, which indicate that deep bedrock aquifers are not in hydrological connection with the shallow formations. Precipitation and stream flow infiltration recharge the bedrock aquifers (Leonard,1984). In general, the quality of groundwater on Fort Carson is good with the exception of localized areas of elevated nitrates, high dissolved solids, and sulfates exceeding secondary drinking water standards. Nitrates have

recently been detected in the groundwater at multiple locations greater than the regulatory standard of 10 milligrams per liter.

4.4.1.3 Floodplains

Executive Order 11988, *Floodplain Management*, requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. To accomplish this objective, the Army is required to take actions to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains for certain federal actions. The acquisition, management, and disposal of federal lands and facilities are specific qualifying federal actions addressed within the EO. Subsequently, the EO requires the application of accepted flood-proofing and other flood protection measures for new construction of structures or facilities within a floodplain. Agencies are required to achieve flood protection, wherever practicable, through elevation of structures above the base flood level rather than filling in land.

4.4.2 Environmental Consequences

4.4.2.1 Proposed Action

Short-term, negligible impacts related to stormwater runoff during the construction phase of the Proposed Action are possible.

4.4.2.2 No Action

Under the No Action Alternative water quantity and quality would be unaffected.

4.4.2.3 Cumulative Effects

Recent construction of the facilities and associated impervious surfaces with the brigade complex on Wilderness Road has resulted in the need for improved stormwater runoff management. Impacts from the increase in impervious surface are managed through a system of detention ponds and check dams which have returned the hydrology of the area to pre-development flows.

Future construction on Butts Army Airfield may result in increased runoff to the Rock Creek watershed. The water removal plan produced as part of the Stormwater Pollution Prevention Plan will address any issues that may be associated with these cumulative impacts.

4.4.2.4 Site-specific Mitigation

In order to address potential short-term impacts associated with construction activities, the execution of the Proposed Action would include temporary construction site best management practices to prevent sediment and other contaminants from leaving the project area. Additionally, a water removal plan will be developed as part of the Stormwater Pollution Prevention Plan that will address the runoff impacts associated with draining the dam.

4.5 Cultural Resources

4.5.1 Existing Conditions

Cultural resources management on Fort Carson encompasses conservation of resources of significance to the history or prehistory of the United States or of traditional, religious, or cultural importance to Native Americans. These resources consist of the material manifestations of the knowledge, beliefs, art, morals, laws, and customs particular to a people or society. Fort Carson manages cultural resources associated with all major prehistoric and historic cultural periods recognized on the southern Great Plains and Rocky Mountains.

Federally-funded archaeological and historical studies have been conducted on the land encompassed by Fort Carson since the 1980s. Prehistoric, historic, and multi-component sites occur throughout the installation, many of which have been determined to meet the criteria of eligibility for inclusion in the National Register of Historic Places (NHRP). Approximately 94,300 acres of Fort Carson have been inventoried for historic properties, with approximately 30,300 acres un-surveyed (this figure does not include over 13,000 acres of un-surveyed area within the two impact areas). Over 1,200 archaeological sites (excluding isolated finds) have been identified. Currently, Fort Carson considers 130 of these sites eligible for inclusion in the National Register of Historic Places, with an additional 52 sites requiring further evaluation for a determination of eligibility.

4.5.2 Environmental Consequences

4.5.2.1 Proposed Action

The Fort Carson Cultural Resources Manager has determined that the Proposed Action constitutes an undertaking as defined in 36 CFR 800.16(y) of the National Historic Preservation Act.

The CRM conducted an initial review of the actions required for the repair of Townsend Dam and determined that no adverse effects to historic properties would be expected as defined in 36 CFR 800.5. The entire area encompassed by the Proposed Action is located within land that has been previously inventoried for cultural resources. Within the previously surveyed area there are two archaeological sites and one isolated find, none of which are considered eligible for inclusion in the National Register at this time.

4.5.2.2 No Action Alternative

There is no additional potential for adverse effects to historic properties under the No Action Alternative. No effects on cultural resources would be expected under the No Action Alternative. All Army actions affecting the involved parcels would conform to installation policies and relevant regulatory frameworks.

4.5.2.3 Cumulative Effects

The cumulative impact to cultural resources consists of past, present, and reasonably foreseeable future actions which affect archeological resources, historic resources, or their viewsheds on and near Fort Carson. As is true of cultural and historic resources world-wide, impacts to such places are tied to land use; i.e., a particular culture's view of the landscape it occupies and the societal functions that the land fulfills for that group. Each subsequent population or activity that occupies a landscape produces an impact to past land use practices and cultural remains. The foundation of archaeological and anthropological investigation was formed within these tenets of human progress in order to understand the past, present, and future. Landscapes with repeated use tend to contain high site densities, as human populations are drawn to natural resources, such as water, arable land, minerals, and climates hospitable for game and crops. Repeated land use also means re-use of both natural and man-made materials, such as is seen in the remnants of numerous stone structures scattered throughout Colorado.

The implementation of the Proposed Action may result in direct or indirect loss of cultural resources in the State of Colorado through reconstruction and repair activities, but such risk is not significantly affected by this action. It is anticipated that the Proposed Action would not result in significant adverse cumulative impacts with the Cultural Resources Management Program policies in place to preserve Fort Carson's historic and archaeological resources. These include,

but are not limited to the on-going identification and evaluation of archaeological resources, utilization of cultural landscape analyses, the "mitigation by design" approach used in the planning process for all Fort Carson activities, continued stakeholder and Tribal involvement, and the retention of qualified professionals who meet or exceed the Secretary of the Interiors Standards and Guidelines for Archaeology and Historic Preservation.

There will be no significant cumulative impacts to the cultural resources located on Fort Carson due to the Proposed Action. Consultation under Section 106 of the NHPA with the State Historical Preservation Office (SHPO) and consulting parties gained concurrence from all parties with Fort Carson's recommended finding of "no historic properties affected" for the Townsend Dam project.

4.5.2.4 Site-specific Mitigation

Under the NHPA, the Native American Graves Protection and Repatriation Act (NAGPRA), the Archaeological Resources Protection Act (ARPA), and all other cultural resources laws and regulations, the term *mitigation* generally refers to total data recovery of an archaeological site. This term under NEPA is used to discuss the measures employed to avoid or minimize potential effects to historic properties. It is rare that Fort Carson cultural resources personnel recommend total data recovery of an archaeological site.

In accordance with 36 CFR 800.3-6 of the NHPA, Section 106 consultation was conducted with the Colorado State Historic Preservation Officer.

5.0 SUMMARY OF EFFECTS AND CONCLUSIONS

5.1 Unavoidable Adverse Effects Should the Proposed Action Be Implemented

Some adverse effects due to reconstruction and repair activities cannot be avoided if the Proposed Action is implemented. Disturbance of soils and vegetation would occur, and these effects would be cumulative and short-term. There would be no effects to federal- or state-listed species.

Table 5.1 summarizes potential effects for each alternative, after mitigation. Environmental effects would not be significant within the larger geographic and temporal context in which they would take place.

Table 5.1: Summary of Potential Environmental Consequences

Resource Area Environmental Consequence	No Action Alternative	Proposed Action
Geology & Soils	No impact	Short-term adverse during reconstruction and repair, but mitigable.
Biological Resources	No impact	Short-term adverse during, drainage, reconstruction, and repair, but mitigable.
Water Resources	No impact	Short-term adverse during drainage and reconstruction
Cultural Resources	No impact	No effect

5.2 Irreversible and Irretrievable Commitments of Resources

The Proposed Action would involve no irreversible or irretrievable commitment of resources other than the consumption of various expendable materials, supplies, and equipment associated with reconstruction, repair, and implementation of environmental mitigation measures.

5.3 Conclusions

The Proposed Action to reconstruct and repair John Townsend Dam at Fort Carson was analyzed by comparing potential environmental consequences against existing conditions. Implementation of the Proposed Action would provide the necessary stability and water holding capability of the structure, therefore the No Action Alternative (no reconstruction and repair) is not the preferred course of action.

As demonstrated in Table 5-1 short-term adverse environmental impacts from the Proposed Action would be expected with regard to geology and soils, biological resources, and water resources. Restabilization and water holding capability from implementation of the Proposed Action is considered to outweigh the relatively minor environmental impacts, particularly since every effort would be made to minimize those impacts. Implementation of the Proposed Action would not cause significant impacts to human health or the environment. Preparation of an Environmental Impact Statement is not required and a Finding of No Significant Impact will be published in accordance with 32 CFR 651, Environmental Analysis of Army Actions.

6.0 PERSONS CONTACTED

Dawn Beall – Forester, Directorate of Public Works DPW
Richard Bunn – Wildlife Office Program Manager, DPW
Kacey Burton – Archaeologist / GIS Analyst, Stell Environmental Enterprises, contractor, DPW
Jessica Frank – Stormwater Program Manager, DPW
Brian Goss – Natural Resources Specialist, DPW
Dan Gray – Forester, DPW
Vince Guthrie- Utilities Program Manager, DPW
Bill Hennessy – Attorney, HQ, 4th Infantry Division (M) & Fort Carson Office of the Staff Judge Advocate
Bradley Johnson- NEPA Coordinator, DPW
James Kulbeth – Noxious Weeds Program Manager and CWA Section 404 Coordinator, DPW
Jeffrey Linn – Natural Resources and Forestry Section, Conservation Branch Chief, DPW
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Wayne Thomas – NEPA and Cultural Management Branch Chief, DPW
Matt Wheeler- GIS Analyst, DPW

7.0 REFERENCES

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8.0 ACRONYMS

AR – Army Regulation
ARPA – Archaeological Resources Protection Act
BAAF- Butts Army Airfield
BMPs – Best Management Practices
CAB- Combat Aviation Brigade
CDPHE – Colorado Department of Public Health and Environment
CEQ – Council on Environmental Quality
CFR – Code of Federal Regulations
CNHP – Colorado Natural Heritage Program
CPW – Colorado Parks and Wildlife
CRM – Cultural Resources Manager
CWA- Clean Water Act
DECAM – Directorate of Environmental Compliance and Management (DECAM responsibilities are now executed within the Directorate of Public Works, Environmental Division).
DPW- Department of Public Works
EA – Environmental Assessment
EO – Executive Order
FNSI – Finding of No Significant Impact
INRMP- Integrated Natural Resource Management Plan
MBTA- Migratory Bird Treaty Act
MS4 – Municipal Separate Storm Sewer Systems
NAGPRA – Native American Graves Protection and Repatriation Act
NEPA- National Environmental Policy Act
NHPA – National Historic Preservation Act
NOA – Notice of Availability
NOI – Notice of Intent
NPDES – National Pollution Discharge Elimination System
NRCS – Natural Resources Conservation Service
NRHP – National Register of Historic Places
PCMS- Piñon Canyon Maneuver Site
ROI- Region of Influence
SHPO – State Historic Preservation Office
SWMP – Storm Water Management Plan
SWPPP – Storm Water Pollution Prevention Plan
USACE – United States Army Corp of Engineers
USC – United States Code
USDA – United States Department of Agriculture
USEPA – United States Environmental Protection Agency
USFWS – United States Fish and Wildlife Service
USGS – United States Geological Service

APPENDICES

APPENDIX A – Comments Received and Responses

APPENDIX B – Fort Carson Native Grass Mix for Proposed Action Site, Field Grass Mix, Grass Seed Mixture "B"

Seed Type	Variety	Pounds PLS/ acre
Western Wheatgrass	Arriba, Rosana	3.5
Crested Wheatgrass	Road Crest, Ephraim	2.6
Streambank Wheatgrass	Sodar	2.6
Blue Grama	Alma	3.5
Sideoats Grama	Pierre, El Reno, Vaughn	3.5
Sheep Fescue	Covar	1.3
Total= 17.0 lbs PLS/acre		

APPENDIX C – Standard Forestry Operating Procedures

1. Recommended mitigation factors to prevent a possible significant impact to Fort Carson's Urban Forest or MBTA violation.

a) Tree(s) should be retained and incorporated into the landscape of the project.

b) If tree(s) in the project area must be removed then the proponent should replace the tree at the 4 to 1 ratio to mitigate the loss of urban forest. Refer to the Installation Design Guide for the approved tree list.

c) If the tree can be transplanted (less than 9" dbh) the proponent should fund their relocation.

d) Tree(s) remaining on-site that are damage or removed may be charged to the contractor or responsible party.

e) Tree(s) remaining on-site should be protected from construction/equipment activities. The critical root zone (drip line) of the tree and the tree trunk must be protected. No stockpiling of materials or fill within the Critical Root Zone of the tree. Refer to the Installation Design Guide for proper tree care.

f) Coordinate with DPW Wildlife to avoid Migratory Bird Treaty Act (MBTA) violations.

g) All active nests are protected under the MBTA.

2. The appraised value will be calculated using the Council of Tree and Landscape Appraisers CTLA (1992) trunk formula method.

3. All trees deemed necessary for removal are subject to Army Regulation 200-1 (Section 4-3, d., 7 and 8) and Reference Memorandum DAIM-ED, 11 Jan 2007. This policy dictates that all merchantable wood products on Army Lands may not be abandoned, destroyed, or donated.

a) Fort Carson has a merchantable wood products sales program. Proceeds are deposited into the U.S. Treasury under the Forestry Reimbursable Account. Wood sales require a Fort Carson Forest Product Sales Permit.

b) Merchantable wood: All wood will be cut into 14-16" lengths up to a 4" (four inch) top and dropped off at the Building 155 woodlot (Community Recycle Center east of Gate 3).

c) The proponent must contact DPW-Environmental Forestry at 526-1667/1692 when tree removal is scheduled and arrange with the Installation Recycle Center Manager (491-0218) to have the wood yard open for delivery.

4. Refer to CSU standard, 'The Science of Planting Trees" Master Gardner notes #633 for tree planting specifications. Most common problems; tree planting hole is not 3X the size of the root ball or saucer shaped, 2/3 of tree basket is not removed and improper spacing between trees. Because of environmental conditions all trees and shrubs must be on drip irrigation systems.